(2)

February 20, 1961

Dr. Lawrence Dunkelman
Head, Detector Section
Astrophysics Branch
Goddard Space Flight Center
Greenbelt, Maryland

Dear Doctor Dunkelman:

My deep appreciation for the various material and information you recently sent us. The $NiSO_4$ filter will be most useful to us for the case of material of high optical density. In most cases, our specimens can be expected to have an optical density < 1, and the rejection of sideband wavelengths is therefore less urgent. We have been improving the iodine film filters to a peak transmission of ~ 50%; in combination with cation-X films these should be quite satisfactory for routine purposes and convenient to make. However, they have a rejection ratio of only 3+ o.d. units and as you say, would therefore be less likely to meet your needs. However, from some comments from Dr. Chesson (at Lockheed), a thinner filter may be advantageous to utilize the full speed of fast optics and you might want to look more closely at this type of filter. We are finding some advantages in using methocel (Dow methyl cellulose) in place of pva for casting dyed films.

In connection with the exobiological instrumentation, I am beginning to doubt the adequacy of microscopy at a single wavelength and am concentrating on the acquisition of more complete UV spectral data in a fast scanning microspectrophotometer. We are thinking of building a device similar to the one described by Gloersen (JOSA 10/58) - essentially projecting the dispersed image of a series of marked, single particles to the target plate of a television camera. On the readout monitor, the image of the dispersed line will be deflected by the intensity signal to give a direct reading of the spectrum.

We propose to set this up for slower scanning with a vidicon storage tube, meanwhile looking for the most advantageous intensifier tube. I realize there are a number of new developments coming along, and these might well be adapted for the flight model. But what would you recommend now for present availability to incorporate in a laboratory model. We would like if possible to scan at ~100 cps (reading the spectra into a

computer to select interesting ones from an excess of "dirt"). Further as our apertures should be $\gtrsim 1\ \mu$ diameter, preferably $.3\ \mu$, (magnified about 2000 X in our microscope) we are bound to be energy-limited. Our UV spectral band should be $\sim$ 230-300 nm for the identification of DNA. I understand a UV-sensitive image orthicon system is available at the present time. Are any of the alternative systems likely to be (1) of any real advantage for a laboratory prototype, (2) available for actual delivery within a reasonable period? Your advice would be greatly appreciated.

I am enclosing some correspondence with Spectrolab that may interest you. Any comments?

How would the Bendix program compare with the Westinghouse Ebicon?

Yours sincerely,

Joshua Lederberg
Professor of Genetics

cc: Dr. Donald E. Field